

PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

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<b>Annual Review of Base Rates for Fuel</b>	}	<b>Docket No. 2018-3-E</b>
<b>Costs for Duke Energy Carolinas, LLC</b>	}	
	}	
	}	

**Surrebuttal Testimony of  
Devi Glick**

**On Behalf of  
South Carolina Coastal Conservation League and Southern Alliance for  
Clean Energy**

**On the Topic of  
Annual Review of Base Rates for Fuel Costs for Duke Energy Carolinas,  
LLC**

**August 31, 2018**

1 **Q. Please state your name and business address for the record.**

2 A. My name is Devi Glick. I work at Synapse Energy Economics, Inc., located at  
3 485 Massachusetts Avenue in Cambridge, Massachusetts.

4 **Q. On whose behalf are you testifying in this proceeding?**

5 A. I am testifying on behalf of the South Carolina Coastal Conservation League  
6 (CCL) and Southern Alliance for Clean Energy (SACE).

7 **Q. What is the purpose of your surrebuttal testimony in this proceeding?**

8 A. The purpose of my testimony is to discuss the rebuttal testimony of Glen Snider  
9 on behalf of Duke Energy Carolinas (DEC), in response to my direct testimony in  
10 this docket.

11 *Avoided T&D Capacity Costs*

12 **Q. Do you agree with Witness Snider that the intermittency, nondispatchability**  
13 **and uncertainty in Net Energy Metered (NEM) Distributed Energy Resource**  
14 **(DER) locations and quantity justify DEC's decision not to value avoided**  
15 **T&D capacity?**

16 No. DEC is required by the terms of the 2014 Settlement Agreement to Docket  
17 No. 2014-246-E to update the placeholder values of NEM DERs when it becomes  
18 possible to quantify them. The concerns that Witness Snider discussed with  
19 coincidence, intermittency, nondispatchability and uncertainty in NEM DER  
20 locations and quantity all would have been present in 2014 when the Company  
21 agreed to a NEM DER valuation framework that included avoided T&D capacity  
22 as a component. This component is presently quantifiable, and DEC has had  
23 ample time to conduct the necessary studies and analysis needed to quantify this  
24 value consistent with the 2014 NEM DER settlement agreement, which allows for  
25 placeholders to be used until components can be “reasonably quantif[ied].”<sup>1</sup>

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<sup>1</sup> Settlement Agreement, Docket No. 2014-246-E, at pages 4-5, paragraph III.8.

1 **Q. Witness Snider asserts that NEM DERs do not avoid any transmission or**  
 2 **distribution investments by the Company.<sup>2</sup> Do you agree with this**  
 3 **assessment?**

4 A. No. I do not agree with Witness Snider's assertion that NEM DERs cannot avoid  
 5 transmission or distribution system investments.<sup>3</sup> In particular, his statements in  
 6 defense of the Company's assessment focus almost exclusively on the impact of  
 7 solar photovoltaics (PV) on the distribution system and fail to accurately  
 8 differentiate transmission from distribution system impacts. This is significant  
 9 because my testimony primarily focuses on the ability of NEM DERs like rooftop  
 10 solar to avoid or defer *transmission* system projects and expenditures.

11 In his limited testimony regarding avoided *transmission* system costs, Witness  
 12 Snider asserts that the impact of solar PV on the transmission system is similar to  
 13 the impact seen on the distribution system. This statement is incorrect. The  
 14 transmission and distribution systems are often grouped together and treated as  
 15 one because they both deal with wires and the movement of electricity, but they  
 16 are very different. Not only are the two systems operated and planned for in  
 17 separate processes with distinct requirements, but more to the point: DERs such  
 18 as rooftop solar PV connected to the *distribution* system reduce the total load of  
 19 electricity on the upstream *transmission* system. It does not necessarily do the  
 20 same for the distribution system.

21 **Q. Please elaborate on the difference between transmission and distribution**  
 22 **systems impacts.**

23 A. The transmission system aggregates up many smaller distribution systems (see  
 24 Figure 1). At low penetrations of NEM DERs including rooftop solar PV, such as  
 25 the level seen in South Carolina, the electricity produced by the NEM DERs  
 26 installed on the distribution system will be consumed wholly within the  
 27 distribution circuit or area network. This NEM DER generation—even in the  
 28 aggregate for a particular distribution circuit—would in almost all circumstances

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<sup>2</sup> Rebuttal Testimony of Glen Snider, Duke Energy Carolinas, Docket No. 2018-3-E, at page 2.

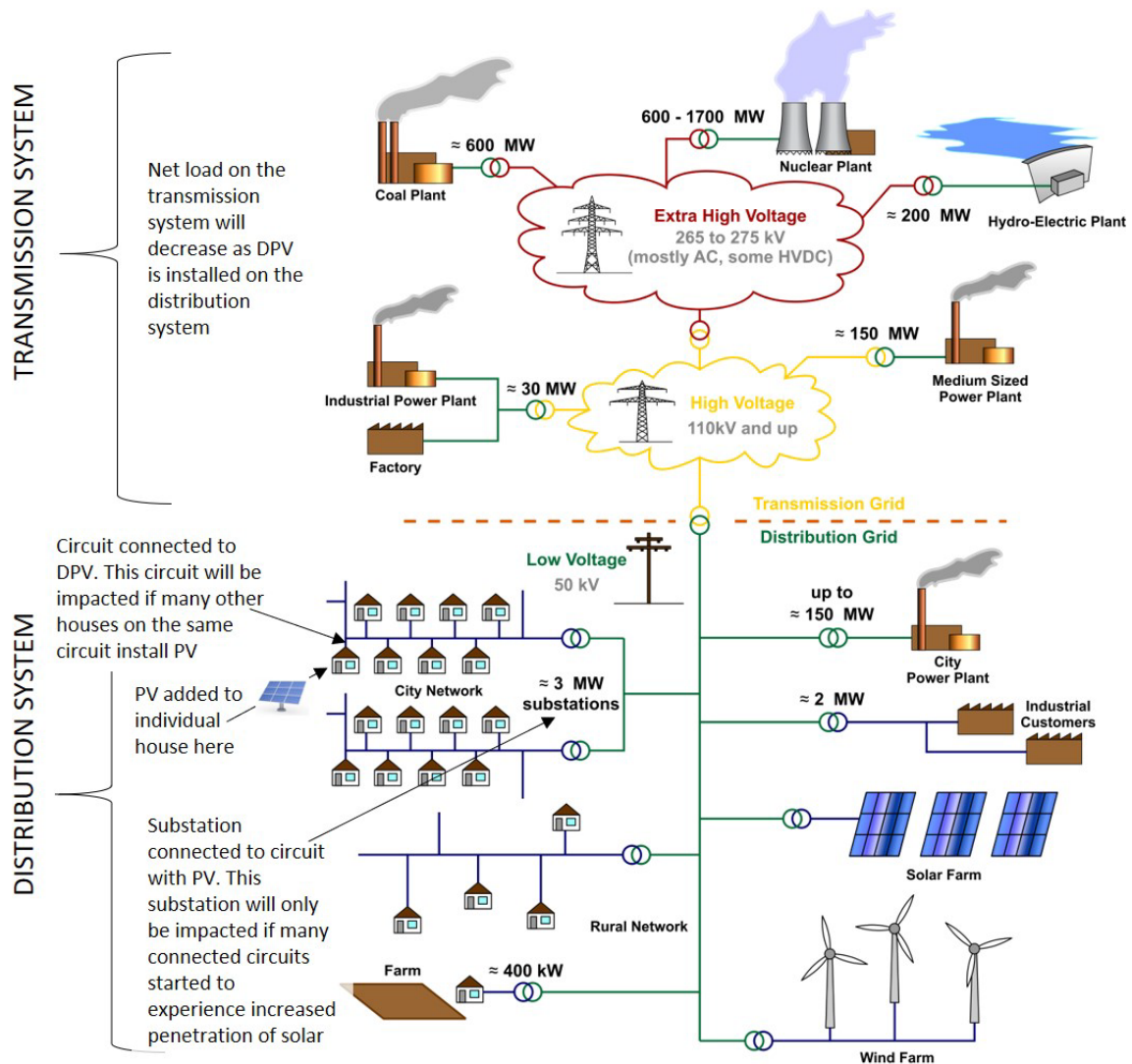
<sup>3</sup> Rebuttal Testimony of Glen Snider, Duke Energy Carolinas, Docket No. 2018-3-E, at page 2.

1 be small enough to avoid any back-feed onto the transmission system. This is  
2 particularly true for rooftop solar systems that are net energy metered and  
3 typically sized to meet a customer's load. The transmission system will  
4 experience a reduction in load akin to what it would experience with increased  
5 demand-side energy efficiency (EE) investments made at the distribution level.  
6 This reduction in load, whether by distribution-level energy efficiency measures  
7 or net metered resources like rooftop solar, contributes to avoiding or deferring  
8 upstream *transmission* system expenditures that would otherwise be needed to  
9 meet load absent the reduction.

10 Witness Snider argues that “[p]lanners have no guarantee that a solar NEM will  
11 be producing coincident with the peak demand needs of a circuit.”<sup>4</sup> But this  
12 reference is to the distribution system rather than the transmission system.  
13 Because solar photovoltaic (PV) DERs are distributed across many circuits in the  
14 distribution system, the set of PV DERs act as a larger generator with a smooth  
15 generation profile when aggregated. Witness Snider fails to consider that the  
16 transmission system interacts with the aggregation of all DERs in the region, and  
17 that the aggregation does not show the same variation seen on individual NEM  
18 DERs.

1 *Figure 1: Transmission and Distribution System Impacts from Distributed Solar PV.<sup>5</sup>*

## TRANSMISSION VS DISTRIBUTION SYSTEM IMPACTS FROM DISTRIBUTED PV



<sup>5</sup> [https://commons.wikimedia.org/wiki/File:Electricity\\_Grid\\_Schematic\\_English.svg](https://commons.wikimedia.org/wiki/File:Electricity_Grid_Schematic_English.svg)

1 **Q. How do you respond to Witness Snider's solar profile that shows a variable**  
 2 **generation profile rather than a smooth profile?**

3 A. On page 4 of his testimony, Witness Snider shows a solar profile from May 22,  
 4 2018 to illustrate the intermittency of solar. This is limited to a single solar PV  
 5 generator on a single day. Across DEC's system, distributed solar PV production  
 6 will vary based on highly localized factors such as cloud cover, but those factors  
 7 only impact a small portion of the service territory at any given time. When NEM  
 8 DERs like rooftop solar PV are spread over a larger area, the production  
 9 variability smooths out. This distributed nature of NEM DERs like rooftop solar  
 10 can make them even more secure, reliable, and predictable than a centralized  
 11 power plant. Their distributed nature means they are less likely to be  
 12 compromised by a single power plant outage, act of nature, cyber-attack, or other  
 13 large event, and there is never the risk that unexpected maintenance needs will  
 14 take them all down at once.

15 **Q. Do you agree with Witness Snider's characterization of your comparison of**  
 16 **distributed solar PV and energy efficiency?**

17 A. No. Witness Snider's testimony misstates my position. I did not assert, as Witness  
 18 Snider suggested, that "distributed solar generation has an identical impact to the  
 19 system as demand-side energy efficiency."<sup>6</sup> This is incorrect.

20 What I did testify to is that the *load reduction* that the transmission system  
 21 experiences will be identical between EE and DPV.<sup>7</sup> This statement is specific to  
 22 load (not impacts broadly) and the transmission system (not the entire system).  
 23 This is important because NEM DERs like rooftop solar impact the transmission  
 24 system and the distribution system in very different manners. Notably, Witness  
 25 Snider does not respond to this point regarding load reduction for the transmission  
 26 system in his rebuttal testimony. He instead sidesteps the issue to discuss how  
 27 solar PV and EE have different impacts on the *distribution* system. This is not

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<sup>6</sup> Rebuttal Testimony of Glen Snider, Duke Energy Carolinas, Docket No. 2018-3-E, at page 5, lines 1-4.

<sup>7</sup> Direct Testimony of Devi Glick, Duke Energy Carolinas, Docket No. 2018-3-E, at page 9, lines 7-12.

1 something I disputed in my Direct Testimony, and in fact is exactly why I  
 2 recommended that DEC conduct a study of the impacts DPV has on the  
 3 distribution system. Studying impacts on the distribution system should not delay  
 4 quantification and adoption of a value that represents the ability of NEM DERs to  
 5 avoid or defer transmission system costs.

6 Finally, to the limited extent Witness Snider does discuss impacts to the  
 7 transmission system, his testimony focuses on the impacts of large or utility-scale  
 8 solar PV rather than the net energy metered DERs like rooftop solar that the NEM  
 9 DER methodology seeks to value.

10 **Q. Witness Snider cites the intermittency, non-dispatchability, and uncertainty**  
 11 **of distributed solar PV location as the primary reasons it is impossible for**  
 12 **NEM DERs to avoid T&D investments. Are these factors unique to DEC's**  
 13 **service territory?**

14 A. No they are not. Distributed solar PV in DEC's service territory is not  
 15 fundamentally different from distributed solar PV elsewhere in the country,  
 16 including the multiple jurisdictions where avoided T&D values have been  
 17 quantified, both in the energy efficiency context and in the distributed solar PV  
 18 context. There is no reason that DEC could not also calculate an avoided T&D  
 19 value, particularly the value of NEM DER like rooftop solar's ability to avoid or  
 20 defer transmission system costs.

21 **Q. Can you provide examples of avoided T&D calculations and values from**  
 22 **other jurisdictions?**

23 A. NEM DERs like rooftop solar are regularly assigned a value for avoiding T&D  
 24 capacity costs by utilities across the US. For a full list of examples please see my  
 25 direct testimony<sup>8</sup> and the accompanying study I authored for Rocky Mountain  
 26 Institute which was filed with the Commission in Docket No. 2018-2-E.<sup>9</sup>

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<sup>8</sup> Direct Testimony of Devi Glick, Duke Energy Carolinas, Docket No. 2018-3-E, at pages 8-11.

<sup>9</sup> Hansen, L, Lacy, V, and Glick, D. 2013. *A Review of Solar PV Benefit and Cost Studies*. Rocky Mountain Institute. This study is available at <https://rmi.org/wp->

1 Additionally I offered several examples of DER valuation by system planners,  
 2 including PJM and CAISO. Witness Snider is right that CAISO and DEC's  
 3 service territories are different, but that does not change the fact that NEM DERs  
 4 like rooftop solar are providing quantifiable and tangible benefits in the form of  
 5 avoiding transmission and distribution system expenditures that would otherwise  
 6 be incurred and passed on to ratepayers. The values may differ by region and  
 7 territory, but the fact that there is value is consistent across jurisdictions.

8 **Q. Witness Snider also claims that generation from distributed solar PV cannot**  
 9 **be guaranteed to match with peak. Does distributed solar PV generation ever**  
 10 **align with DEC's system peak?**

11 A. Yes, as evidenced by DEC's own planning documents. DEC assigns solar a  
 12 generating capacity credit in its Integrated Resource Plan (IRP) (46% of  
 13 nameplate in summer, 5% of nameplate in winter) because it is expected that solar  
 14 PV will provide generating capacity during times of peak demand.<sup>10</sup> Because  
 15 transmission peak requirements are consistent with generation peak requirements,  
 16 distributed PV should be credited with this value.

17 **Q. Witness Snider claims that you based your avoided T&D capacity**  
 18 **calculations on the 46% summer peak capacity contribution of solar. Is this**  
 19 **accurate?**

20 A. No. I based my calculation of the avoided transmission capacity value on the  
 21 conservative assumption that the system is dual peaking. I used the winter peak  
 22 capacity contribution of 5% not the 46% summer peak capacity contribution in  
 23 my calculations. This methodology was outlined in my Direct Testimony<sup>11</sup> and  
 24 the accompanying Exhibit DG-3.

25 **Q. Witness Snider asserts that your reliance on historic data for your**  
 26 **calculations will produce inaccurate results. Do you agree?**

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content/uploads/2017/05/RMI\_Document\_Repository\_Public-Repts\_eLab-DER-Benefit-Cost-Deck\_2nd\_Edition131015.pdf

<sup>10</sup> Duke Energy Carolinas, 2017 Integrated Resource Plan Annual Report, Docket No. 2017-8-E, at page 22.

<sup>11</sup> Direct Testimony of Devi Glick, Docket No. 2018-3-E, at page 13, lines 18-24.



1 A. No. This criticism is unavailing because DEC's transmission system is not  
 2 projected to fundamentally change over the next few years. For this reason, it is  
 3 appropriate to assume that historical spending on avoided transmission capacity is  
 4 a reasonable approximation for future spending on transmission capacity.

5 **Q. What is your recommendation with regards to the avoided T&D capacity**  
 6 **costs?**

7 A. I maintain my recommendation that the Commission direct the Company to  
 8 incorporate into its NEM DER valuation an avoided transmission capacity value  
 9 of \$0.005028/kWh as outlined in my Direct Testimony.<sup>12</sup> This value represents  
 10 the ability of NEM DERs like rooftop solar to avoid or defer transmission system  
 11 costs by reducing the overall load on the transmission system. Witness Snider's  
 12 rebuttal does not change this recommendation. The concerns he discusses in  
 13 rebuttal are primarily focused on the distribution system, in contrast to my focus  
 14 on the transmission system benefits of NEM DERs. His limited testimony  
 15 regarding the transmission system misstates my testimony and calculation  
 16 methodology and discusses potential impacts of large or utility-scale solar PV  
 17 rather than the net energy metered DERs like rooftop solar that the NEM DER  
 18 methodology seeks to value.

19 *Avoided Environmental Costs*

20 **Q. Witness Snider states that the variable operating costs associated with coal**  
 21 **ash disposal are included within the avoided energy component of NEM**  
 22 **DER.<sup>13</sup> Are you satisfied with this treatment of variable coal ash disposal**  
 23 **costs?**

24 A. No. To the extent that DEC is including the handling costs of coal ash in the  
 25 avoided energy calculation, the Company should separately state or break out the  
 26 value and represent it transparently for the Commission and intervenors as an  
 27 avoided environmental cost. The Company already separately reports avoided

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<sup>12</sup> Direct Testimony of Devi Glick, Docket No. 2018-3-E, at page 13, line 23.

<sup>13</sup> Rebuttal Testimony of Glen Snider, Duke Energy Carolinas, Docket No. 2018-3-E, at page 10, lines 10-11.

1 criteria pollutants. For transparency, coal ash handling costs should similarly be  
2 reported separately in the avoided environmental cost category. At a minimum,  
3 the 2014 NEM settlement requires a clearer indication for any avoided  
4 environmental costs that are included in the avoided energy component: “[t]he  
5 Avoided Energy component must specify if [avoided environmental costs] are  
6 included.”<sup>14</sup>

7 **Q. Witness Snider defends DEC’s exclusion of the capital costs associated with**  
8 **building new coal ash impoundments from the NEM calculation, stating that**  
9 **value is small and effectively rounds to zero, and would not begin to accrue**  
10 **until 2023. Are you satisfied with this answer?**

11 A. No. The avoided capital cost associated with coal ash landfills is on the same  
12 order of magnitude as the avoided cost of criteria pollutants, which is reported  
13 separately by the Company. The 2014 Settlement Agreement requires that  
14 placeholder categories will be updated when the capability to reasonably quantify  
15 the values becomes available. The settlement agreement does not give DEC  
16 discretion to choose not to quantify something it views as having too small a  
17 value.

18 Additionally, Witness Snider states that the value will not begin to accrue until  
19 2023. He cites 2023 because this is the date that one of the existing coal ash  
20 landfills is projected to be full and no longer usable. This assessment of when  
21 value will begin to accrue is incorrect. When aggregated, NEM DERs like rooftop  
22 solar can delay the need for a new dry coal ash lined landfill or expansion.  
23 Deferring the date that a new landfill is needed saves ratepayers money in the  
24 interim period and has a real and quantifiable value.

25 The Company should update its NEM DER methodology calculations to account  
26 for these avoided costs.

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<sup>14</sup> Settlement Agreement, Docket No. 2014-246-E, Attachment A (description of environmental costs).

- 1   **Q.**     **Does this conclude your testimony?**
- 2   **A.**     **Yes.**